UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/077,029 | 05/18/1998 | MUTSUMI KIMURA | JAO40499 | 5555 |

25944 7590 04/01/2009

OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

| EXAMINER | |
|---|---|
| LIN, JAMES | |
| ART UNIT | PAPER NUMBER |
| 1792 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 04/01/2009 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/077,029 | KIMURA ET AL. | |
| | Examiner | Art Unit | |
| | Jimmy Lin | 1792 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *20 February 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *101-105,107-112 and 123-130* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *101-105,107-112 and 123-130* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/6/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Interpretations*

1. The term "surround" has been given its ordinary meaning, which is to form an enclosure round or to encircle.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 101-104 are rejected under 35 U.S.C. 103(a) as being obvious over Roitman (U.S. Patent 5,972,419) in view of Ra et al. (U.S. Patent No. 5,874,200).

Roitman discloses a method of making an EL device (abstract). Pixel electrode 132 is formed on a substrate and a solid insulating layer 131 is formed on the electrode. EL material is deposited in the wells formed between the insulating layers (col. 3, lines 29-50). The insulating layer can be left in place (col. 4, lines 1-2). The purpose of the insulating layer is to confine the droplets of EL material, preventing them from mixing.

Roitman does not explicitly teach enhancing a liquid repellency at a surface of the insulating layer. However, Roitman does teach in a first embodiment that insulation layers can be formed on the substrate to confine the droplets, and in a second embodiment that hydrophilic and hydrophobic regions can be formed on the substrate in order to confine the droplets. Using both embodiments together would have further ensured the confinement of the droplets and, thus, would have been an obvious modification. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have used insulating layers while at the same time forming hydrophilic and hydrophobic regions on the substrate of Roitman with a reasonable expectation of success. One would have been motivated to do so in order to have further ensured the confinement of the droplets. In light of these teachings, one of ordinary skill in the art would

have made the first electrode more wettable towards the liquid droplets while making the insulating layers more repellent.

Roitman does not explicitly teach that enhancing a liquid repellency at the surface of the insulating layer is performed by one of an ultraviolet (UV) irradiation and an irradiation of plasma. Roitman does teach that the insulating layer 131 can be a conventional photoresist material. Accordingly, Ra teaches a method of reducing the hydrophobicity of a photoresist such that the photoresist comes to have more hydrophilicity. The method comprises of exposing the photoresist to UV irradiation (col. 3, line 57-col. 4, line 17). Roitman exemplifies xylene as a suitable solvent (col. 3, lines 1-10). Xylene is a hydrophobic liquid and would be at least somewhat repellent to a hydrophilic surface. Because the combination of using insulating layers as well as forming hydrophobic and hydrophilic regions would have been obvious over the teachings of Roitman, it would have been obvious to one of ordinary skill in the art at the time of invention to have exposed the insulating layers of Roitman to UV irradiation in order to have made the insulating layers more hydrophilic towards xylene with a reasonable expectation of success. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945).

Roitman does not explicitly teach the order of patterning the insulating layer and enhancing the liquid repellency of the insulating layer. However, one of ordinary skill in the art would have expected similar results in performing the patterning of the insulating before or after enhancing the liquid repellency because either method would have enhanced the upper surface of the insulating layer. The selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results. See, for instance, *In re Burhans,* 154 F.2d 690, 69 USPQ 330 (CCPA 1946). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have performed the patterning step *after* the enhancing step, as opposed to performing the patterning step *prior to* the enhancing step, with a reasonable expectation of success because one of ordinary skill would not have anticipated any new or unexpected results and, thus, would have done so with predictable results.

Roitman does not explicitly teach that the repellency of the side-wall of the insulating layer is lower than the liquid repellency of the upper surface of the insulating layer. However,

this phenomenon occurs when the UV liquid repellency enhancement step of Ra is performed before the patterning step. Because only the top surface of the insulating layer is exposed to the UV irradiation when irradiation occurs prior to patterning, the repellency of the side-walls of the insulating layer has not been enhanced. Thus, performing the UV irradiation prior to patterning would necessarily form side-walls having less repellency than the upper surfaces.

4. Claims 101-104 and 129-130 are rejected under 35 U.S.C. 103(a) as being obvious over Roitman (U.S. Patent 5,972,419) in view of Tsuchiya et al. (U.S. Patent No. 5,536,603).

Roitman is discussed above, but does not explicitly teach that enhancing a liquid repellency at the surface of the insulating layer is performed by an irradiation of plasma including fluorine. Roitman does teach that the insulating layer 131 can be a conventional photoresist material. Accordingly, Tsuchiya teaches that it was well known to have exposed a photoresist to a fluorine plasma in order to enhance the repellency (col. 7, lines 49-57; Figs. 9A-9C). Because the combination of using insulating layers as well as forming hydrophobic and hydrophilic regions (i.e., attracting and repelling regions) would have been obvious over the teachings of Roitman, it would have been obvious to one of ordinary skill in the art at the time of invention to have exposed the insulating layers of Roitman to fluorine plasma in order to have made the insulating layers repellent to the droplets of EL material with a reasonable expectation of success.

5. Claims 105, 107-111, and 126-127 are rejected under 35 U.S.C. 103(a) as being obvious over Roitman '419 in view of Kaneko (JP 07-153574), Ohno et al. (U.S. Patent No. 5,705,302), and Yamazaki et al. (U.S. Patent No. 5,929,464).

Roitman is discussed above, but does not explicitly teach a plurality of first electrodes on predetermined positions and forming an insulating layer so as to surround the predetermined positions. However, Kaneko teaches that it was well known in the art of EL devices to have formed pixels/subpixels 14 in rectangular shapes. Insulating layers 13 are used to form the pixel/subpixel regions. In this configuration, the insulating layers surround a plurality of electrodes 12 (Figs. 1, 3, and 5-8). The regions in which the pixel/subpixel are to be formed correspond to the predetermined positions as claimed Because Roitman teaches that insulating

layers are used to define pixels and because Kaneko teaches that such insulating layer configurations were operable in the EL art, it would have been obvious to one of ordinary skill in the art at the time of invention to have formed an insulating layer so as to surround a plurality of electrodes to define rectangular pixels in the EL device of Roitman with a reasonable expectation of success.

Roitman does not explicitly teach a difference of wettability between the first electrode and the insulating layer. However, Roitman teaches in a first embodiment that insulation layers can be formed on the substrate to confine the droplets, and teaches in a second embodiment that hydrophilic and hydrophobic regions can be formed on the substrate in order to confine the droplets. Using both embodiments together would have further ensured the confinement of the droplets and, thus, would have been an obvious modification. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have used insulating layers while at the same time forming hydrophilic and hydrophobic regions on the substrate of Roitman with a reasonable expectation of success. One would have been motivated to do so in order to have further ensured the confinement of the droplets. In light of these teachings, one of ordinary skill in the art would have made the first electrode more wettable towards the liquid droplets while making the insulating layers more repellent.

Roitman does not explicitly teach that the wettability of the first electrode is enhanced. However, Ohno teaches that conductive layers such as those made of indium tin oxide (ITO) can be made hydrophobic with treatments such as RF plasma and UV light irradiation (col. 9, lines 13-25). The enhanced hydrophobicity of the ITO film would be more wettable towards the hydrophobic xylene solvent of Roitman. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have enhanced the hydrophobicity of the first electrode of Roitman (Roitman exemplifies ITO as a suitable first electrode material, see col. 2, lines 40-42) with a reasonable expectation of success because Roitman made the suggestion of having hydrophobic and hydrophilic regions in order to confine the droplets and because Ohno teaches that ITO films can be treated to enhance hydrophobicity. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945).

Roitman does not explicitly teach an active matrix type EL device and that the first electrodes are electrically coupled to a corresponding transistor. However, Yamazaki teaches that an active matrix display unit is capable of performing a distinct display of a larger capacitance than that of a simple matrix display unit (col. 1, lines 16-22). A plurality of transistors connected in series can be attached to one pixel electrode (abstract). It would have been obvious to one of ordinary skill in the art at the time of invention to have provided the EL display of Roitman as an active matrix type device with a reasonable expectation of success. One would have been motivated to do so in order to have provided a distinct display of a larger capacitance. Additionally, it would have been obvious to one of ordinary skill in the art at the time of invention to have connected transistors of the active matrix system to the corresponding first electrodes of Roitman with a reasonable expectation of success because Yamazaki teaches that such configurations were operable for an active matrix display.

Claim 107: Kaneko teaches that the insulating layer covers at least part of the first electrodes (Fig. 3).

Claim 108: Roitman does not explicitly teach that forming an interlayer film on the insulating layer, wherein the interlayer film is repellent to the liquid solution compared to the first electrode. However, any method of making the region of the insulating layer to be hydrophilic would have been operable. Forming a hydrophilic film onto the insulating layer would have been an operable method and would have been well within the knowledge of one of ordinary skill. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have formed a hydrophilic film onto the insulating layer of Roitman in light of the teachings of Roitman with a reasonable expectation of success. One would have been motivated to do so to have made a hydrophilic region.

Claim 109: Roitman teaches that the liquid solution is deposited by an ink jet method.

Claim 111: In light of the teachings of Roitman, one of ordinary skill in the art would have made the insulating layer hydrophilic while enhancing the hydrophobicity of the first electrode according to the method of Ohno. Thus, the insulating layer would be more repellent to the liquid solution compared to the electrode.

Claims 126-127: Kaneko teaches that a second electrode 16 can be formed over the insulating layer and the optical material.

6. Claim 112 is rejected under 35 U.S.C. 103(a) as being obvious over Roitman '419 in view of Kaneko '574, Ohno '302, and Yamazaki '464 as discussed above for claim 110, and further in view of Ra '200.

Roitman is discussed above, but does not explicitly teach that the repellency of the side-wall of the insulating layer is lower than that of the upper surface of the insulating layer. However, such is obvious for substantially the same reasons as discussed in claim 101.

7. Claim 112 is rejected under 35 U.S.C. 103(a) as being obvious over Roitman '419 in view of Kaneko '574, Ohno '302, and Yamazaki '464 as discussed above for claim 110, and further in view of Tsuchiya '603 for substantially the same reasons as discussed immediately above.

8. Claims 123 and 128 are rejected under 35 U.S.C. 103(a) as being obvious over Roitman '419 in view of Kaneko '574 and Ra '200 as discussed above for claim 101, and further in view of Yamazaki '464.

Roitman does not explicitly teach an active matrix type EL device and that the first electrodes are electrically coupled to a corresponding transistor. However, Yamazaki teaches that an active matrix display unit is capable of performing a distinct display of a larger capacitance than that of a simple matrix display unit (col. 1, lines 16-22). A plurality of transistors connected in series can be attached to one pixel electrode (abstract). It would have been obvious to one of ordinary skill in the art at the time of invention to have provided the EL display of Roitman as an active matrix type device with a reasonable expectation of success. One would have been motivated to do so in order to have provided a distinct display of a larger capacitance. Additionally, it would have been obvious to one of ordinary skill in the art at the time of invention to have connected transistors of the active matrix system to the corresponding first electrodes of Roitman with a reasonable expectation of success because Yamazaki teaches that such configurations were operable for an active matrix display.

Claim 128: Kaneko teaches that a second electrode 16 can be formed over the insulating layer and the optical material.

9. Claims 123 and 128 are rejected under 35 U.S.C. 103(a) as being obvious over Roitman '419 in view of Kaneko '574 and Tsuchiya '603 as discussed above for claim 101, and further in view of Yamazaki '464 for substantially the same reasons as discussed immediately above.

10. Claims 124-125 are rejected under 35 U.S.C. 103(a) as being obvious over Roitman '419 in view of Ra '200 as discussed above for claims 101 and 103, and further in view of Kaneko '574.

Roitman teaches forming a second electrode, but does not explicitly teach that forming a second electrode over the solid insulating layer and the optical material. However, Kaneko teaches that it was well known to have formed a second electrode 16 over both the solid insulating layer 13 and the optical material 15 (Figs. 1 and 7-8). Because Kaneko teaches that such EL structures were operable, it would have been obvious to one of ordinary skill in the art at the time of invention to have formed the second electrode of Roitman over the insulating layer and optical material with a reasonable expectation of success.

11. Claims 124-125 are rejected under 35 U.S.C. 103(a) as being obvious over Roitman '419 in view of Tsuchiya '603 as discussed above for claims 101 and 103, and further in view of Kaneko '574 for substantially the same reasons as discussed immediately above.

***Response to Arguments***

12. Applicant's arguments filed 2/20/2009 have been fully considered but they are not persuasive.

A. Roitman in view of Ra:

Applicant argues on pg. 7 that the Roitman teaches, in a first embodiment, forming a mask on the substrate to confine droplets and, in a second embodiment, forming hydrophilic or hydrophobic regions on the substrate to confine the droplets. Applicant further argues that the combination of the two embodiments would not have been obvious because Roitman indicates that the use of hydrophilic or hydrophobic regions as an alternative to use of a mask. However, Roitman indicates that the two embodiments are both used to achieve the purpose of confining

the droplets. Combining equivalents known for the same purpose is *prima facie* obvious (see MPEP 2144.06.I.). One of ordinary skill in the art would have recognized that the use of both methods together would have been operable and that it would have had the benefit of increased isolation. Although the modification may have some set backs, there was sufficient motivation and predictability to make such modifications. Thus, the combination of using a mask on the substrate and hydrophilic/hydrophobic regions on the substrate with the purpose of confining the droplets would have been *prima facie* obvious.

Applicant argues on pg. 8-9 that the hydrophilic/hydrophobic regions would be formed on the substrate and that the mask would be formed on the substrate such that the mask would be formed over at least one of the hydrophilic or hydrophobic regions because both the hydrophilic/hydrophobic regions and the mask must be formed on the substrate. However, Roitman teaches that "[t]he locations of the pixels are defined by a single mask 131 which is deposited on top of the bottom electrode 132" (col. 3, lines 30-32) and that "the surface on which the droplets are deposited can be arranged in a plurality of hydrophilic or hydrophobic regions so that the droplets are confined by surface tension" (col. 4, lines 56-59). The mask represents the non-deposition part of the anode where the droplets are not intended to be deposited onto. The placement of the mask in those areas of the anode would already prevent the droplets from being deposited onto those parts of the anode. It would be unreasonable and unnecessary to form a hydrophilic/hydrophobic region on the areas of the anode under the mask to prevent droplets from being deposited in the non-deposition areas because there is little to no possibility of the droplets reaching the areas under the mask layer. Rather, there is the possibility that droplets can be deposited onto upper surfaces of the mask (i.e., over the non-deposition areas), e.g., if too many droplets were deposited between the mask such that the EL material would start to overflow or if the droplets were unintentionally deposited directly onto the upper surfaces of the mask. The idea that forming the hydrophilic/hydrophobic regions on the upper surfaces of the mask would have been commensurate with the teaching that "the surface on which the droplets are deposited can be arranged in a plurality of hydrophilic or hydrophobic regions so that the droplets are confined by surface tension". Thus, one of ordinary skill would have recognized that it would have been more obvious and practical to have formed hydrophilic/hydrophobic regions on the upper surfaces of the mask, rather than on the parts of the anode below the mask,

when combining the two embodiments of Roitman. The combination of the two embodiments of Roitman would have been obvious for the reasons previously discussed above.

Applicant argues on pg. 9 that enhancing the liquid repellency on the mask of Roitman would likely be detrimental in the formation of electron transport layer 106 over the mask. However, Roitman does not teach any inoperability when forming an electron transport layer over either the mask or the hydrophilic/hydrophobic regions. One of ordinary skill in the art would have recognized that the formation of an electron transport layer in the combination of the two embodiments would have been just as operable as the individual embodiments.

Applicant argues on pg. 9 that Roitman does not disclose that there is a problem with the mask containing the EL materials deposited as droplets. Although Roitman does not teach that a problem exists with either of the embodiments, combining the two embodiments of Roitman for the same purpose of confining the droplets would have been *prima facie* obvious. Combining equivalents known for the same purpose is *prima facie* obvious (see MPEP 2144.06.I.).

Applicant argues on pg. 9-10 that one of ordinary skill in the art would recognize that the mask, as a physical barrier, would have no difficulty containing the droplets because gravity would ensure that the EL material would not exit from the regions between the walls of the mask. However, there is the possibility that the droplets or the EL material would come in contact with the upper surfaces of the mask, e.g., if too many droplets were deposited between the mask such that the EL material would start to overflow or if the droplets were unintentionally deposited directly onto the upper surfaces of the mask.

Applicant argues on pg. 10-11 that the combination of Roitman and Ra would have resulted in the substrate of Roitman being irradiated to enhance liquid repellency on the substrate, not the surface of the mask. However, the formation of the liquid repellency on the surface of the mask would have been more obvious and practical than the method proposed by Applicant for the reasons previously discussed above.

B. Roitman in view of Tsuchiya

Applicant argues on pg. 12 that it would not have been obvious to modify Roitman by Tsuchiya because Roitman's mask is not formed on a quartz substrate. However, both Tsuchiya

(col. 11, lines 7-13) and Roitman (col. 2, line 42) teach that the substrate can be made of glass. Therefore, the substrates of Tsuchiya and Roitman are similar.

Applicant argues on pg. 12-13 that Roitman does not disclose that there is a problem that the EL material "grows" on the mask. Applicant further argues that the EL droplets are applied within the wells of the mask and that the walls of the mask extend above the height of the EL layer. However, there is the possibility that droplets can be deposited onto upper surfaces of the mask (i.e., over the non-deposition areas), e.g., if too many droplets were deposited between the mask such that the EL material would start to overflow or if the droplets were unintentionally deposited directly onto the upper surfaces of the mask.

Applicant argues on pg. 13 that Tsuchiya fails to disclose exposing resist patterns to a fluorine plasma prior to patterning the resist patterns and exposing resist patterns so that the upper surface of the resist patterns has a greater liquid repellency than a liquid repellency of the inner wall of the insulating layer because the exposure of Tsuchiya would treat both the upper surface and the inner walls of the resist patterns. However, as discussed in paragraph 3 above, one of ordinary skill in the art would have expected similar results in performing the patterning of the insulating before or after enhancing the liquid repellency because either method would have enhanced the upper surface of the insulating layer. The selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results. See, for instance, *In re Burhans,* 154 F.2d 690, 69 USPQ 330 (CCPA 1946). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have performed the patterning step *after* the enhancing step, as opposed to performing the patterning step *prior to* the enhancing step, with a reasonable expectation of success because one of ordinary skill would not have anticipated any new or unexpected results and, thus, would have done so with predictable results.

C. Roitman in view of Kaneko, Ohno and Yamazaki

Applicant argues on pg. 14 that the combination fails to disclose "forming the plurality of the first electrodes at predetermined positions on a substrate" and "forming an insulating layer so as to surround the predetermined positions" (emphasis added) because Kaneko's mask layer 13 is not formed around the same positions of the electrodes 12. However, the electrodes are formed

at the pixel/subpixel locations and the insulating layers are formed so as to surround the pixel/subpixel locations. The pixel/subpixel locations correspond to the predetermined positions as claimed. Thus, Kaneko teaches the limitations discussed above.

Applicant argues on pg. 14-15 that it would not have been obvious to modify Roitman to combine the embodiment of mask 131 with an embodiment of enhancing the hydrophilicity of the regions in the wells of the mask. However, Examiner is maintaining his position that it would have been obvious to have combined the two embodiments of Roitman, as discussed in section A in the "Response to Arguments" section above.

Applicant argues on pg. 16 that Ohno discloses that the transparent conductive particles have the hydrophobic surfaces (col. 9, lines 1314), but does not disclose whether the color layers 14 containing them have a hydrophobic surface. Applicant further argues that Ohno discloses that the adding of the transparent conductive particles to color layers 14 is done to increase the conductivity of the color layers 14. However, Ohno is being used to modify the method of Roitman because the combination of the two embodiments of Roitman would include the use of hydrophilic regions and hydrophobic regions. The hydrophobic regions would be required at the electrode portion of Roitman because the droplets are to be deposited on the electrode. Roitman teaches that the electrode can be made of ITO (col. 2, lines 40-42). Ohno teaches that the hydrophobic treatment is applied to ITO material (col. 9, lines 13-17). Thus, Ohno teaches an operable method of changing the ITO of Roitman to have hydrophobic properties.

Applicant argues that there is no reason to make the proposed combination, taking the references as a whole, because (1) the substrate of Roitman is not a color layer; (2) Roitman's substrate would not benefit by being conductive even if the transparent conductive particles of Ohno could be added to it; (3) Roitman does not disclose any use of a silane coupling agent that would benefit by using Ohno's RF plasma / UV radiation process. However, (1) Roitman discloses the use of an ITO layer and Ohno discloses the treatment of ITO particles. One of ordinary skill in the art would have recognized that the ITO particle treatment of Ohno would have been operable operable on the ITO film of Roitman. (2) Roitman would have benefited from the hydrophobic properties of the ITO film after the treatment of Ohno in order to have formed hydrophilic regions and hydrophobic regions to confine the droplets. (3) Ohno teaches the use of coupling agents that can be used with the ITO particles. One of ordinary skill in the

art would have recognized that such coupling agents of Ohno would have had to be used when treating the ITO film of Roitman.

D. Roitman in view of Kaneko, Ra or Tsuchiya, and Yamazaki

Applicant argues on pg. 17 that the applied references fail to disclose feature (1) quoted above for the same reason discussed above in relation to Roitman and Kaneko (see section C above), feature (2) quoted above for the same reasons discussed in relation to (a) the unobviousness of the combination of the two embodiments of Roitman using mask 131 and using hydrophobic/hydrophilic regions, and (b) the unobviousness of the combinations of Roitman and Ra (see section A above) and Roitman and Tsuchiya (see section B above). However, the arguments have already been addressed above in the respective sections.

***Conclusion***

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jimmy Lin whose telephone number is (571)272-8902. The examiner can normally be reached on Monday thru Friday 8AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jimmy Lin/
Examiner, Art Unit 1792

/Timothy H Meeks/
Supervisory Patent Examiner, Art Unit 1792